Water resilient green cities in Africa Newsletter issue 1

Retrofitting cities to live with flood and drought

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Water Resilient Green Cities in Africa

Newsletter
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Retrofitting cities to live with flood and drought

Flood and drought brought by climate change urge world cities to develop towards resiliency. Using green infrastructure and urban landscape for flood resilience is being implemented in, among other places, Denmark. African cities are vulnerable to flood and drought, with their fast urbanization and relatively low infrastructure development. Research collaboration between Danish and African partners can transfer knowledge and support the sustainable development of African cities.

Challenges of African cities
Demand for water in African cities is growing. Population growth in cities is the main driving force of this demand. The changing industrial structure and increasing expectation for water quality brought by economic growth will add to it. According to the World Bank, the population in African cities will be doubled over the next 20-25 years and the demand for water in Africa will almost quadruple. Cities are forced to rely on water sources further from the city. Land-use changes upstream alter the pattern of runoff. Poor sanitation impacts health and threatens groundwater sources. Climate change will aggravate these challenges for water.

Green infrastructures for integrated urban water management
The complex of challenges calls for new approaches other than the conventional pipe systems for water supply and storm- and wastewater discharge. Establishing a strong green infrastructure in the city with climate adaptation awareness and eco-technologies is a promising approach for this purpose. It will reduce the impact of flood and at the same time provide day to day services to the citizens like e.g. water supply and areas for recreation and food production.

Research can help
Relevant research in Denmark such as 2BG (www.2bg.dk) and Water in Cities (www.vandibyer.dk) has shown that research can facilitate a rapid mind-set change towards a climate sensitive planning practice, which uses urban green spaces in providing urban water services, and create a market for "green growth" options in urban areas. This project will expand earlier experience from Denmark and seek to "leap-frog" development of urban water services in Addis Ababa and Dar es Salaam by means of eco-technologies and green infrastructure.

Involving stakeholders
City stakeholder involvement is a major element in the project. Knowledge is generated in collaboration with users and stakeholders who jointly prioritize needs at city stakeholder start-up meetings and at subsequent meetings in advisory groups throughout the project. The aim is to further involve city stakeholders in design workshops at pilot sites.

The general objective of the research is to explore water resilience by using urban green infrastructure as a climate change adaptation strategy in flood and drought prone cities, using Addis Ababa and Dar es Salaam as cases. Partner teams have been established within three fields of study: green space, water management and institutional analysis. To conduct interdisciplinary research and reach integrated strategies and solutions, researchers have been appointed to work across fields. Six PhD students have been enrolled and are developing projects across the main research fields. To understand and link conditions and overall problems in the cities with specific local conditions and options for solutions, the project works at different scales: city, catchment and site scale. Common criteria for selection of case catchment and pilot sites have been developed and a case catchment with upstream, midstream and downstream pilot sites have been selected for both cities.

3 partners 2 case cities

The project is conducted jointly by: the Institute of Human Settlements Studies (IHSS) at Ardhi University, Tanzania, the Ethiopian Institute of Architecture, Building Constuction and City Development (EiABC) at Addis Ababa University, Ethiopia, and the Department of Geosciences and Natural Resource Management (IGN) at the University of Copenhagen, Denmark. The project will be implemented in close collaboration with representatives from the city administrations and selected communities in the two case cities, Addis Ababa and Dar es Salaam.

4 working packages

The project is implemented in four work packages (WPs). Each WP is led by the research institution with most expertise in the field. WP1 addresses the physical structure and the livelihood activities of urban green spaces and is led by EiABC. WP2 focuses on stormwater management and is led by IGN. WP3 researches the institutional set-up and stakeholder involvement and is led by IHSS. WP4 integrates research activities and management across WPs, cities and institutions, and is led by IGN.

WP leaders

6 PhD students

A total of six PhD students are enrolled, three in Addis Ababa and three in Dar es Salaam. The six PhD studies all take a starting point in urban stormwater management, but work at different scales and bridge the WP themes in different ways. PhD1 from Addis Ababa and PhD4 from Dar es Salaam look into the spatial and structural aspects of Landscape-based Stormwater Management (LSM) mainly at a city scale and combines the structural analysis and mapping of green space, flood risk and stormwater management with urban planning and institutional analysis in order to understand what LSM is and what it could be. PhD2 from Addis Ababa and PhD5 from Dar es Salaam do an inventory into the land use, tenure, water and food nexus. With an outset in the multiple uses and conflicting interests in formal and informal green areas the study links the challenges and potentials in utilizing water for food production with the barriers and possibilities from an institutional point of view. PhD3 from Addis Ababa and PhD6 from Dar es Salaam investigate and test specific topics and options for the development of water resilient cities.

PhD students

City researchers

It is an important element of this project to compare and integrate the research subjects between the two case cities throughtout the project. The city researchers at EiABC and IHSS will play the role of doing research across WP1, WP2 and WP3. Other researchers at EiABC and IHSS focus on the potentials of integrating stormwater management (WP2) with either urban ecology, green spaces, use & livelihoods (WP1) or urban planning & governance (WP3).

City researchers

Expected results

Using green infrastructure for climate adaptation of cities is an emerging phenomenon in academia and in the policy making arena and its feasibility in developing countries is under-researched. The project will therefore create new knowledge and understanding in this field. New knowldege will be disseminated among academics, policy-makers and other stakeholders by academic papers, workshops and newsletters throughout the project process.

It is anticipated that research can leap-frog the real-life development of urban water services in the two case cities via pilot projects that actively engage stakeholders.

Besides, the six PhD students and a new master course will be direct outcomes of the project, which will further the knowledge in the context of African cities.

FAST FACTS

Project title:	Water Resilient Green Cities for Africa
Main funding source:	Danida
Duration:	September 2013 – August 2017
Size:	9,054,244 DKK
Partnership:	Three partners from three countries
Coordinator:	Department of Geoscience and Nature Management University of Copenhagen
Website:	www.watergreenafrica.dk

Project management team

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Case Study Areas

The city of Addis Ababa is the capital of Ethiopia. The population of Addis Ababa has developed dramatically. What used to be a population of 443,000 in 1961 has grown to 2,7 million in 2007 in official figures. However, it is estimated that the population has reached 4 million. The city is located at average altitude of 2400 meters above sea level, at the foot of a mountain range (2900 meters above sea level). Many rivers pass through the city and become polluted. The city experiences both heavy rains and severe drought. Few of the rivers are equipped with dams for the water supply of the city.

The research team at EiABC identified two watershed areas –Jemo and Little Akaki rivers water shed areas, where the former is a tributary of the latter. Three case study sites are chosen. Two of the sites are along Jemo river watershed – an upstream site containing a significant number of informal settlers suffering from a severe scarcity of water, and a midstream site dominated by public housing (condominium) with abundant open spaces not properly used. The downstream site includes a university college prone to flooding, a stretch of highly polluted river and an intensively developed urban agriculture area using the polluted river water for irrigation.

The City of Dar es Salaam is Tanzania's largest and richest city, serving as a regionally important economic center. The Dar es Salaam Region had a population of 4.4 million as of the official 2012 census. Dar es Salaam is a coastal city. In the rainy season, many areas of the city suffer from flooding and stagnant water. According to local researchers, 50% of the problems with flooding is a consequence of human impact and 'bad management' such as garbage in drainage channels and streams and lack of infrastructure.

The Mbezi river catchment of about 56 square kilometers is chosen as the research area. Three case study sites are selected along the river. One is the upstream Mbezi Luis consisting of low density residential development and urban agriculture activities. The second is Goba-Kibululu in the midstream, a low density unplanned residential area. The third is Kawe Ukwamani located downstream and consisting mainly of unplanned residential areas that extend into the river banks. Kawe Ukwamani often experiences flooding problems.

A HOUSEWIFE IN ADDIS ABABA

She has lived on the plot for five years now. Her family includes seven people. The communal tap is open twice a week, Tuesdays and Thursdays. In her household they use two "Jerry" cans (2x 20L) a day. She is key responsible for fetching the water and do the laundry. It costs her 50 cents to buy water from the public tap. Her husband uses a rented car (by which he can transport 6-7 Jerry cans at a time) or a donkey to transport water from where it is available. The transport from the city to their home, for example, costs 60 Birr. Sometimes it is difficult for them to afford the water.

One of the biggest difficulties in their live is that the public taps is not always working. After electricity, health and education, water is the critical issue for the family. She is collecting rainwater for washing from their roof. She has two cans for this type of water.

A MOTHER IN DAR ES SALAAM

The tap close to her home is not working for some time. Despite the promises by the community and water utility the pipe is still dry. Even if there was to be water in the pipes again, it would probably not reach the family's house, as she saw that the pipes were destroyed, when the road was renovated.

There is a well for washing cloth, cleaning the dishes and irrigation on her farmland. The community maintains the well and it is free for use by around ten families. So far there has always been water in the well. When it declines, they dig deeper. The well lies as a small basin on a low lying spot on her land where all the stormwater runoff enters. The well is about two meters deep. At the moment there is little water in the well due to little rain and many consumers. There are also building activities going on in the neighborhood, which consume water from the well.

For her family of three (two adults, one child) they buy 40L of water from a freshwater truck. It costs 800 Schilling for three days. Additionally they use 80-100L per day from the well on their ground for other purposes. They also use water for their (poor) flush toilet. She collects rainwater and uses it on a day to day basis, but she does not have money to buy a larger rain tank.

Latest progress

The project officially started on September 1, 2013. A press letter was launched in Denmark. During the fall 2013, six PhD students were selected by IHSS and EiABC, in collaboration with IGN. Through a process of discussion and document exchange among all three partners by Skype, Dropbox and emails, preliminary case catchment and pilot site selection criteria have been developed and case sites have been selected in the two cities. Reports on the physical and social characteristics of the case catchments and pilot sites have been prepared. The working process also resulted in a common understanding of the project plan.

MoU signed with city stakeholders in Addis Ababa

In early 2014, the project team in Addis Ababa signed a Memorandum of Understanding with city stakeholders for collaboration in the coming years. The event was announced in local newspapers, radio and TV.

Pre-study of Addis Ababa

In late January 2014, the IGN team visited Addis Ababa and made a pre-study of Addis Ababa cases together with the EiABC team. Project members visited potential catchments and pilot sites, and held workshops with stakeholders in the preliminary case sites.

1st project conference in Dar es Salaam

The first project conference was successfully held in late January 2014 in Dar es Salaam. The three project teams met face to face and discussed the project framework, goals, cases, as well as the research approach and tools. Project members from all three teams also visited the preliminary case sites in Dar es Salaam, interacted with stakeholders from the city and held workshops with PhD students. Common understanding on the goals and tasks in the coming years was reached through the conference and workshops.

During the conference, an open competition for project logo was held among project members, which resulted in a winning logo designed by Dr. Ole Fryd, IGNs external researcher.

Stakeholder seminar and survey in Addis Ababa

In May 2014, the research team in Addis Ababa held a stakeholder seminar for the adjusted case areas in the city. Collaborated with the research team at IGN, survey on the current understanding of water challenges and the concept of landscape based stormwater management was conducted by 35 stakeholders.

Baseline report

During Spring 2014, an outline for the baseline report was collaboratively developed by the project teams. The baseline report outline will be used as a working document for gathering all the materials that is available within each subject and summing up on the up-to-date research results within the project. The report will be finalized when the PhD students come to Denmark in the Autumn 2014. The baseline report will be used as a basis for further analyses together with the PhD students and city researchers.

Field works at the two case cities for WP2

In late June, the IGN team conducted field work in both cities, supported by the local research teams. The field work served to provide input to the understanding of urban water management and coping strategies at catchment and case site level in particular and to provide some input at the city level. Interviews with local residents were conducted at the case sites, providing rich stories related to the urban water challenges.

The project hits the public media in Denmark and Africa

During summer 2014, the project appeared several times in Danish and African media. The news disseminated the project to broader audience, which may increase the awareness of the research and influence the public interest on landscape based stormwater management. See examples at:

http://www.dr.dk/Nyheder/Viden/Miljoe/2014/07/211130433.htm
http://www.modernghana.com/news/558872/1/danish-stormwater-solution-to-solve-drought-and-fl.html

The coming half year

All six PhD students have just arrived in Copenhagen in late August 2014 for a three months research stay as Danida fellows. Through PhD courses, project workshops and meetings, they will intensively develop their projects with their IGN supervisors and the IGN research team, and contribute to the development of the project as a whole. The PhD students and the IGN research team will attend the IARU Sustainability Science Congress in Copenhagen in late October 2014. Early results of the project will be presented by then.

2nd project conference will be held in the end of January 2015. Further information will be announced in the project website.

WGA Partners

University of Copenhagen, Denmark

UNIVERSITY OF COPENHAGEN

Addis Ababa University, Ethiopia

EiABC
Ethiopian Institute of Architecture, Building Construction and City Development
Addis Ababa University

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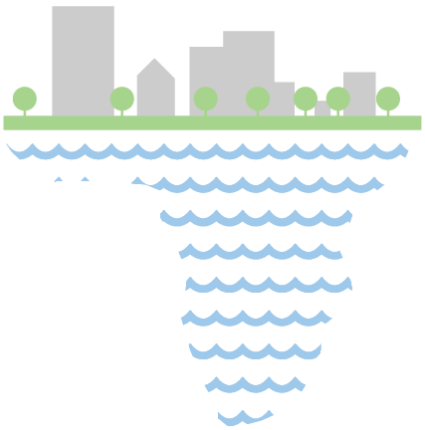

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www.watergreenafrica.dk

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